

CLAIMS

1. An apparatus for treatment of a skin disorder, the apparatus comprising:
 - (a) at least one light source with spectral emittance concentrated in at least one specific narrow spectral band, wherein one spectral band is in the range of 405 to 440 nm;
 - (b) an optical system for collecting and shaping light emitted from said at least one light source; and
 - (c) an electronic unit to control parameters associated with said spectral emittance from said at least one light source.
2. The apparatus of claim 1, wherein said parameters include at least one of a group including duration, power and emitted spectral bands of said light source emittance.
3. The apparatus of claim 1, further comprising:
 - a mechanical fixture for holding said light source at an adjustable distance and direction related to a treatment area.
4. The apparatus of claim 1, wherein an illumination energy of said light source flux, is higher than a predetermined threshold level.
5. The apparatus as in claim 4, wherein said threshold level is a level required for biological destruction of acne and seborrhea causing factors.
6. The apparatus of claim 4, wherein said illumination energy threshold level of said illumination light source is at least 40 mw/cm² at a distance from the light source of 30 cm.

7. The apparatus of claim 1, wherein the illuminated area on a patient body by said light source comprises an illumination area large enough to illuminate an infected typical size skin area from a fixed position of said light source related to said skin area.

5 8. The apparatus of claim 7, wherein said illuminated area is at least 400 cm².

9. The apparatus of claim 1, further comprising an illumination head comprising at least two converging collimated beams from at least two directions, each of said beams generated by a separate light source positioned at a distance from said other at least one light source.

10. The apparatus of claim 1, further comprising:

a computer controlled imaging unit for imaging an illuminated treated area and for monitoring by counting lesions on said treated area, using computerized counting techniques.

15 11. The apparatus of claim 10, further comprising:

a computer controlled display unit for displaying said imaged illumination treated area, wherein counting is carried out by an operator marking lesions on the display of said illumination treated imaged surface area.

20 12. The apparatus of claim 10, further comprising:

a computer controlled display unit for displaying said imaged illumination treated area and for enabling computer lesions counting by

image processing techniques to detect and count each lesion in the illumination treated imaged surface area.

13. The apparatus of claim 10, wherein the score of said computer lesion counting is recorded in a computer memory to enable monitoring the lesion healing process through a series of consecutive treatments.

14. The apparatus of claim 10, wherein said computer controlled imaging unit display image includes at least one of a group including a graph of the number of counted lesions versus accumulated treatment time and a table consisting of number of counted lesions in each treatment session.

15. The apparatus of claim 1, further comprising:

at least one optical element of a group comprising a liquid filled light guide, a solid transparent light guide, a fiber bundle light guide and an array of lenses and mirrors for collecting and conducting the said light source radiation and illuminating the skin treated area at an adjustable distance, energy density and direction.

16. The apparatus of claim 1, wherein said at least one light source is a Gallium, Mercury and halides gas mixture discharge lamp with peak emission in the 405-440 spectral band.

17. The apparatus of claim 1, wherein said at least one light source is selected from the group including Ion Krypton gas laser with a spectral emission in the range 405 to 440nm, and a diode, wherein said diode is selected from the group consisting of violet/blue laser diodes, and light emitting diodes (LED) with narrow spectral band emission in the range 405-440nm.

18. The apparatus of claim 1, wherein the light of said at least one light source is collected and further projected by at least one reflector, wherein said reflector is selected from the group comprising of an elliptical cross-section cylindrical reflector, parabolic cross-section cylindrical reflector, and an asymmetric aspheric reflector.

19. The apparatus of claim 1, wherein the light of said at least one light source is collected and further collimated by a set of two orthogonal cylindrical lenses.

20. The apparatus of claim 18, wherein the light of said at least one light source is collected by an elliptical cross-section reflector having a first focal point and a second focal point and wherein said light source is disposed at said first focal point and has disposed at said second focal point a slit shape aperture of a slit to circular beam shaping and conducting light guide.

21. A method of treating a skin disorder, comprising:

providing a light radiation source having spectral characteristics of at least one of a group of narrow spectral bands consisting of violet/blue (405-440nm), red (630-670nm) and green (520-550nm) light;

applying a compound to a skin area;

illuminating said skin area with said light radiation source; and

additionally illuminating said skin area after a predetermined time period.

22. A method as in claim 21, wherein said compound is selected from a group consisting of a topical oxygen transporting perfluorocarbon, an oxidative agent, a keratolytic agent and a methylene blue solution

23. A method as in claim 21, wherein said predetermined time period is at least 24 hours.

24. A method as in claim 21, wherein said skin disorder is one of a group including acne and seborrhea.

25. A method as in claim 21, further comprising:

pretreatment application of at least one compound selected from said compound group;

concentrating said light on said skin area by an optical system and a mechanical fixture; and

exposing said skin area at specific time intervals.

26. A method as in claim 25, wherein said time interval is 1-5 weekly exposures to violet/blue light for typically 2- 10 weeks, with a minimum 24 hour's time gap between exposures.

27. A method as in claim 21, wherein said step of illuminating is accomplished by projecting on said skin area with an illumination power in the range of 10mW/cm² to 500mW/cm² of violet/blue light radiation.

28. The method according to claim 21, wherein said compound is hydrogen peroxide in the concentration of 1-10% by weight and the concentration of salicylic acid is 1-10% by weight.

29. The method according to claim 25, wherein said pretreating is carried out daily.

30. The method according to claim 25, wherein said pretreating is carried out immediately before light exposure.

5 31. The method according to claim 25, wherein the material selected from the group consisting of oxidative and keratolytic compounds is in an aqueous gel.

10 32. The method according to claim 22, wherein the material selected from the group consisting of oxidative and keratolytic compounds is in oil in water emulsion.

33. The method according to claim 22, wherein the oxidative and/or keratolytic compound is within a material selected from the group consisting of a liposome and a positively charged submicron emulsion.

15 34. The method according to claim 22, wherein the oxidative and/or keratolytic compounds is in a Propylene glycol 10-50% base.

35. The method according to claim 22, wherein the oxidative compound is an oil in water emulsion mixed with molecular oxygen that is sprayed continuously on the skin before or during light exposure.

20 36. The method according to claim 22, wherein methylene blue 0.1-5% in distilled water or gel bases is applied to the skin before or during light exposure.